

Motion and Sound

3-5 The student will demonstrate an understanding of how motion and sound are affected by a push and pull on an object and the vibration of an object (Physical Science)

3-5.3 Explain how the motion of an object is affected by the strength of a push or pull and the mass of the object.

Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-5.2), students explained the importance of pushing and pulling to the motion of an object. Students have not been introduced to the concept of the strength of a push or pull and the mass of an object affecting the motion of an object in previous grades. In 5th grade, students will further develop the concept of the effects of various forces on motion (5-5.1) and how a change in force or a change in mass affects the motion of an object (5-5.6).

It is essential for students to know that the strength of a push or pull and the amount of mass of the object can affect the motion of an object at rest.

- The stronger the push or pull, the faster the object would move.
- The weaker the push or pull, the slower the object would move.
- *Mass* is how much matter is in an object.
- If the strength of the push or pull is the same, an object of greater mass would move slower than an object of lesser mass.

It is not essential for students to know how to measure the strength of the push or pull on an object or to measure the speed of the objects.

Assessment Guidelines:

The objective of this indicator is to *explain* how the motion of objects is affected by the strength of the push or pull and the mass of the object; therefore, the primary focus of assessment should be to construct a cause-(strength of push or pull, mass of object)-and-effect (motion of objects) model showing how the stronger or weaker pushes and pulls affect the motion of objects with more or less mass. However, appropriate assessments should also require students to *infer* which object is heavier or lighter if subjected to the same strength push or pull based on their location in a diagram; *infer* which objects of different masses would move faster if given the same strength push or pull; *infer* which objects of the same mass would move faster or slower if given stronger or weaker pushes or pulls; or *classify* objects based on characteristics listed above.